



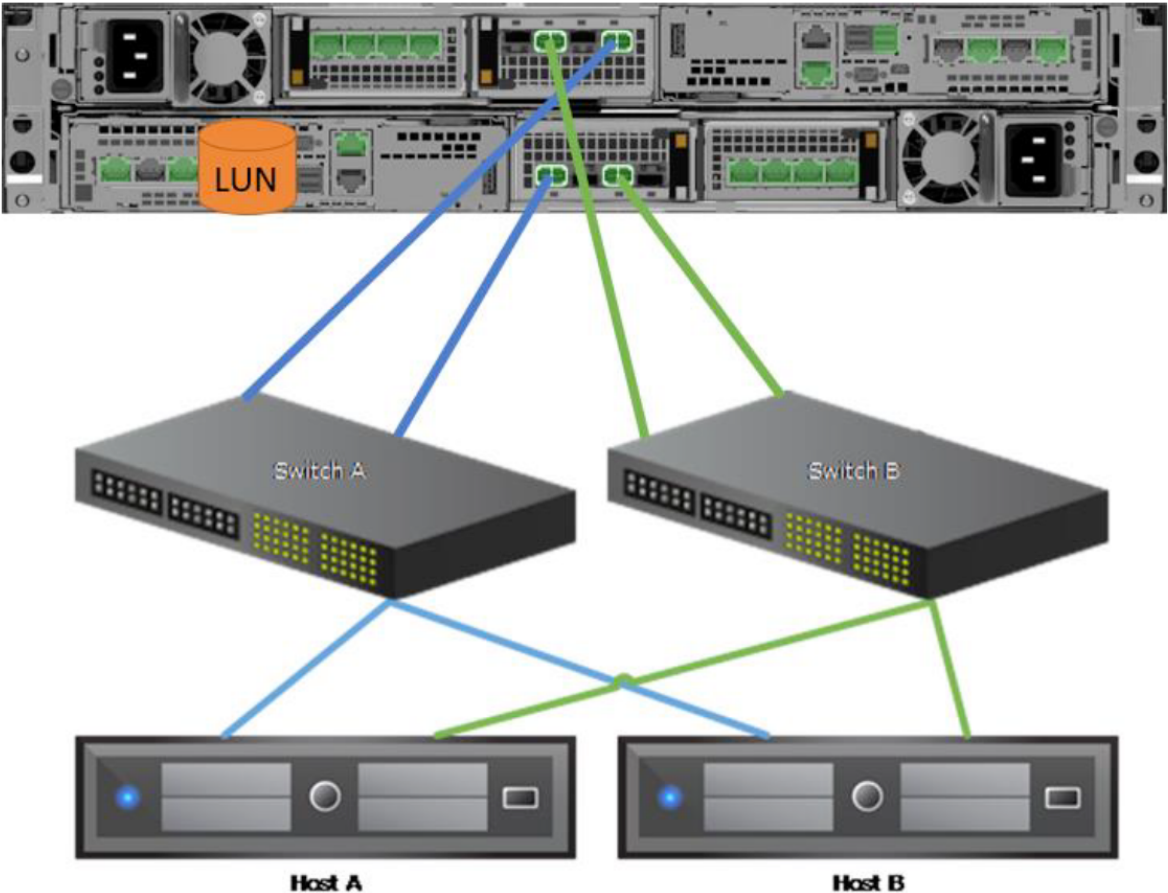
# **Exhibit 20**

**CHART FOR U.S. PATENT NO. 7,672,226 (“the ’226 Patent”)****Accused Products:**

Dell’s products, including but not limited to the Dell Unity series of all-flash (*e.g.*, Unity 300F, 350F, 400F, 450F, 500F, 550F, 600F, 650F; Unity XT 380F, 480F, 680F, and 880F) and hybrid-flash storage (*e.g.*, Unity 300, 400, 500, 600, 650; Unity XT 380, 480, 680, and 880) arrays with PowerPath functionality (“Accused Products”), infringe at least Claim 18 of the ’226 Patent.

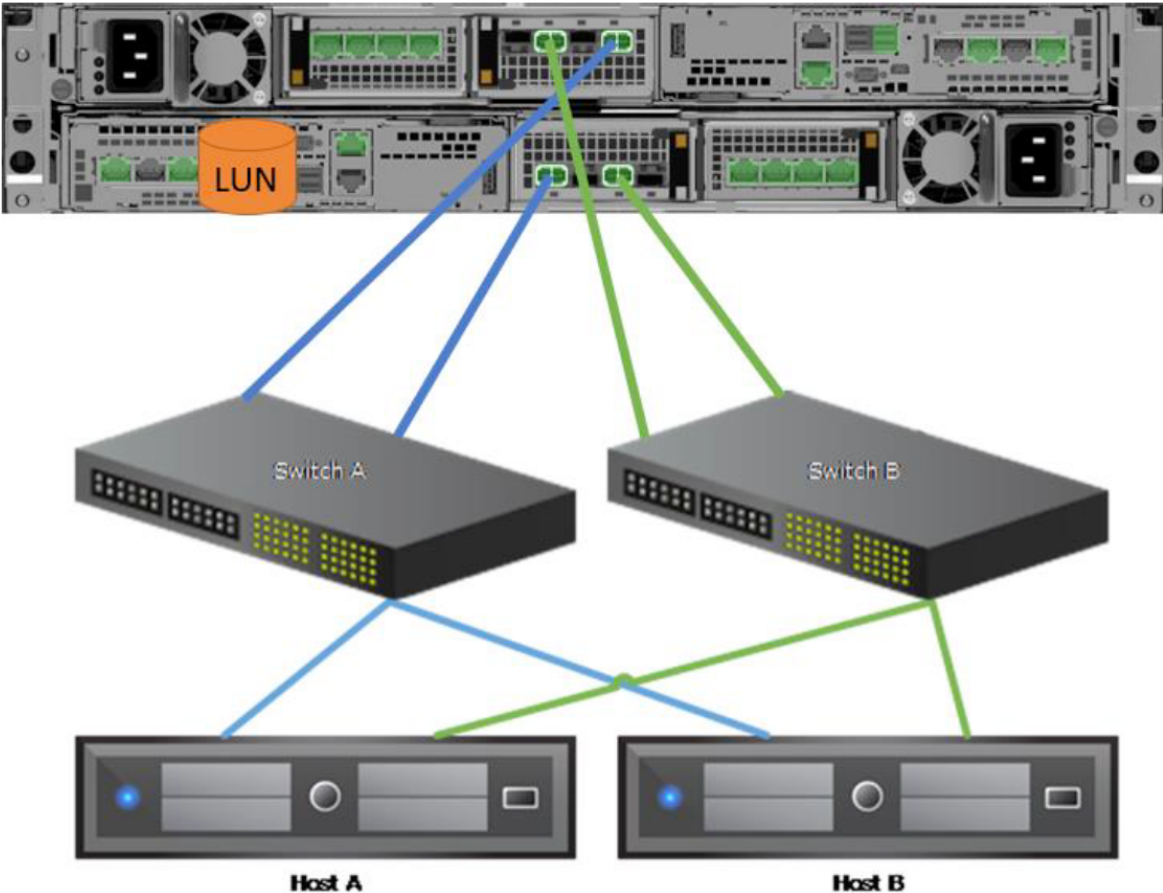
Claims	Exemplary Evidence of Infringement
<p>18 [pre] A port adapter for providing a redundant Fibre Channel path, comprising:</p>	<p>To the extent the preamble is limiting, the Accused Products comprise a port adapter for providing a redundant Fibre Channel path.</p> <p>For example, the Accused Products “feature[] fully redundant hardware” including a “dual node architecture which includes two identical Storage Processors (SPs) for redundancy” that “implement an integrated unified architecture . . . with . . . support for native . . . Fibre Channel protocols.” For example, in “order to achieve high availability with Fibre Channel (FC), configure at least one connection to each SP,” the Accused Products include up to 16 or 20 “FC Ports per Array,” where “two ports are connected on each SP for a total of four available paths to the storage system,” and for “a highly available infrastructure, components that connect to the storage system must also be redundant.”</p> <p><i>See, e.g.:</i></p> <p><a href="#">DELL UNITY XT</a></p> <p><b>All-flash unified storage</b></p> <p>Simplify your operations at low cost with all-flash unified storage platforms to deliver speed, efficiency and multi-cloud support.</p> <ul style="list-style-type: none"> <li>• Up to two times more performance</li> <li>• Guarantee 3:1 data reduction with no assessment</li> </ul> 

Claims	Exemplary Evidence of Infringement
	<p data-bbox="447 240 573 261"><a href="#">DELL UNITY XT</a></p> <p data-bbox="447 277 793 318">Hybrid unified storage</p> <p data-bbox="447 342 827 456">Create the perfect blend of high performance at low cost with unified hybrid flash storage platforms to maintain efficient operations for your multi-cloud.</p> <ul data-bbox="447 480 798 532" style="list-style-type: none"> <li>• Scale up to 16 PB raw capacity</li> <li>• Inline data reduction for all flash pools</li> </ul> <p data-bbox="447 537 968 570"><a href="#">Products – Data Storage – Dell Unity XT</a></p>  <p data-bbox="447 1078 1610 1110"><a href="#">Dell EMC Unity All-Flash Storage Spec Sheet</a>/<a href="#">Dell EMC Unity Hybrid Storage Spec Sheet</a></p>

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	 <p data-bbox="457 1153 835 1177">Figure 19 Block HA Configuration</p> <p data-bbox="457 1201 1596 1323">In this configuration, the LUN is owned by SPA. <u>Two ports are connected on each SP for a total of four available paths to the storage system. Dual switches are used to provide redundancy at the network or SAN level. Each host has two connections, one to each switch, in order to access all four available paths. Two hosts are configured as a cluster to provide failover capabilities in case of a host fault.</u></p>

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	<p>The <u>Dell Unity™</u> purpose-built solution <u>features fully redundant hardware</u> and includes several high availability features. These are designed to withstand component failures within the system itself as well as in the environment, such as network or power. If an individual component fails, the storage system can remain online and continue to serve data. The system can also withstand multiple failures if they occur in separate component sets. After the administrator is alerted about the failure, they can easily order and replace the failed component without any impact. This white paper discusses the <u>redundant hardware</u> and high availability features that are available on <u>Dell Unity and Unity XT</u>, which enables the systems to obtain 99.999% availability.</p> <p><u>When designing a highly available infrastructure, components that connect to the storage system must also be redundant. This includes removing single points of failure at the host and switch level to avoid data unavailability due to connectivity issues. Figure 19 shows an example of a block highly available configuration, which has no single point of failure.</u></p> <h3>Storage Processors</h3> <p><u>Dell Unity is a dual-node architecture which includes two identical Storage Processors (SPs) for redundancy. It features an active/active controller configuration where both SPs are servicing I/O simultaneously. This increases hardware efficiency since there are no requirements for any idle standby hardware. These SPs along with drives, are enclosed within the Disk Processor Enclosure (DPE).</u></p> <h3>Fibre Channel configuration</h3> <p><u>In order to achieve high availability with Fibre Channel (FC), configure at least one connection to each SP. This enables hosts to have continuous access to block-level storage resources if one SP becomes unavailable.</u></p> <p><u>In case of SP failure, the LUN fails over to the surviving SP and continues to service I/O since it is connected to the same switches. In case of switch failure, the remaining switch provides access to both SPs, eliminating the need to use the non-optimized path. In case of host failure, the cluster initiates a failover to the other host and brings the application online. Any path failure due to a bad cable or port does not cause any issues since the second optimized path can be used.</u></p> <p><a href="#"><u>Dell Unity: High Availability – Technical White Paper</u></a></p>

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	<p>Unity XT storage systems implement an integrated unified architecture for block, file, and VMware vVols with concurrent support for native NAS, iSCSI, and Fibre Channel protocols. Each system leverages dual-active storage processors, full 12Gb SAS back-end connectivity and Dell’s patented multicore architected operating environment to deliver unparalleled performance &amp; efficiency with multicloud interoperability. Additional storage capacity is added via Disk Array Enclosures (DAEs).</p> <table><tr><th></th><th>380F/380</th><th>480F/480</th><th>680F/680</th><th>880F/880</th></tr><tr><td>Optional SAS IO ports per Array</td><td>NA</td><td>8 x 4 lane or 4 x 8 lane 12Gb/s SAS ports (for BE Connection)</td><td>8 x 4 lane or 4 x 8 lane 12Gb/s SAS ports (for BE Connection)</td><td>8 x 4 lane or 4 x 8 lane 12Gb/s SAS ports (for BE Connection)</td></tr><tr><td>Base 12 Gb/s SAS BE Buses per Array</td><td>2 x 4 Lane</td><td>2 x 4 Lane</td><td>2 x 4 Lane</td><td>2 x 4 Lane</td></tr><tr><td>Max 12 Gb/s SAS BE Buses per Array</td><td>2 x 4 Lane</td><td>6 x 4 Lane; or 2 x 4 lane and 2 x 8 lane</td><td>6 x 4 Lane; or 2 x 4 lane and 2 x 8 lane</td><td>6 x 4 Lane; or 2 x 4 lane and 2 x 8 lane</td></tr><tr><td>Max FE (front end) Total Ports per Array (all types)</td><td>20</td><td>24</td><td>24</td><td>24</td></tr><tr><td>Max Initiators per Array</td><td>1,024</td><td>2,048</td><td>2,048</td><td>4,096</td></tr><tr><td>Max FC Ports per Array</td><td>20</td><td>16</td><td>16</td><td>16</td></tr></table> <p><a href="#">Dell Unity XT HFA and AFA Storage Specification Sheet</a></p>		380F/380	480F/480	680F/680	880F/880	Optional SAS IO ports per Array	NA	8 x 4 lane or 4 x 8 lane 12Gb/s SAS ports (for BE Connection)	8 x 4 lane or 4 x 8 lane 12Gb/s SAS ports (for BE Connection)	8 x 4 lane or 4 x 8 lane 12Gb/s SAS ports (for BE Connection)	Base 12 Gb/s SAS BE Buses per Array	2 x 4 Lane	2 x 4 Lane	2 x 4 Lane	2 x 4 Lane	Max 12 Gb/s SAS BE Buses per Array	2 x 4 Lane	6 x 4 Lane; or 2 x 4 lane and 2 x 8 lane	6 x 4 Lane; or 2 x 4 lane and 2 x 8 lane	6 x 4 Lane; or 2 x 4 lane and 2 x 8 lane	Max FE (front end) Total Ports per Array (all types)	20	24	24	24	Max Initiators per Array	1,024	2,048	2,048	4,096	Max FC Ports per Array	20	16	16	16
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18 [a] a port, within a storage node and coupled to a Fibre Channel network,	<p>The Accused Products comprise a port, within a storage node and coupled to a Fibre Channel network.</p> <p>For example, the Accused Products comprise a “dual node architecture which includes two identical Storage Processors (SPs) for redundancy” that “implement an integrated unified architecture . . . with . . . support for native . . . Fibre Channel protocols.” For example, in “order to achieve high availability with Fibre Channel (FC), configure at least one connection to each SP,” the Accused Products include up to 16 or 20 “FC Ports per Array,” where “two ports are connected on each SP for a total of four available paths to the storage system.”</p> <p><i>See, e.g.:</i></p>																																			

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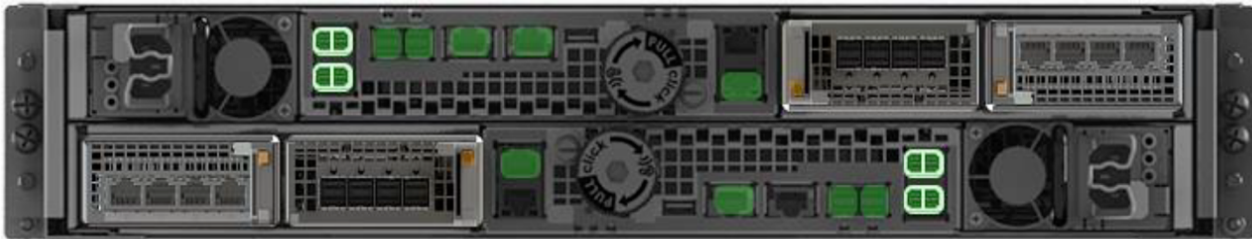


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18 [b] a topology database that stores paths through the network that are available to communicably connect the storage node to a host node; and	<p>The Accused Products comprise a topology database that stores paths through the network that are available to communicably connect the storage node to a host node.</p> <p>For example, the Accused Products include a “configuration database” and a “config command” that “[c]onfigure[s] paths to logical devices” by “perform[ing] the following tasks: configures all detected . . . logical devices and adds these devices to the PowerPath configuration . . . [,] configures all detected paths to PowerPath devices and adds these paths to the PowerPath configuration . . . [, and] adds paths to logical devices . . . .” For example, the Accused Products include a “procedure [that] adds new paths to a logical device already configured” that in turn includes a step that “[s]ave[s] the new configuration.”</p> <p><i>See, e.g.:</i></p>																																			

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	<h2 data-bbox="451 240 1033 292">Internal DB read failed</h2> <p data-bbox="451 316 842 342">The <u>configuration database</u> is corrupted.</p> <h2 data-bbox="451 370 781 418">powermt config</h2> <p data-bbox="451 430 753 456"><u>Configure paths to logical devices.</u></p> <h2 data-bbox="451 483 573 521">Syntax</h2> <pre data-bbox="451 535 630 557">powermt config</pre> <h2 data-bbox="451 584 653 626">Description</h2> <p data-bbox="451 643 905 669"><u>The config command performs the following tasks:</u></p> <ul data-bbox="451 682 1671 1008" style="list-style-type: none"> <li>• <u>configures all detected VMAX/Symmetrix, Unity, XtremIO, VNX, and CLARiiON logical devices as PowerPath devices and adds these devices to the PowerPath configuration</u></li> <li>• configures all detected third-party storage system logical devices as PowerPath devices if their storage system classes are set to managed</li> <li>• <u>configures all detected paths to PowerPath devices and adds these paths to the PowerPath configuration</u></li> <li>• creates devices as required</li> <li>• creates devices on AIX, Linux, and Solaris and uses existing, native devices on HP-UX, Linux, and Solaris</li> <li>• <u>adds paths to logical devices based on the storage-system frame serial number and the logical device serial number. Together, these values (shown in the output of <code>powermt display dev</code>) uniquely identify a logical device. By default, <code>powermt config</code> adds devices under PowerPath control with the Symmetrix optimization, CLARiiON optimization, or Adaptive load-balancing and failover policy, write throttling set to off, and a write throttle queue depth of 256. It adds paths with the mode set to active. It adds storage systems with periodic autorestore set to on.</u></li> </ul> <p data-bbox="451 1021 1201 1047">Config does not remove previously configured paths when they become dead paths.</p> <p data-bbox="441 1057 1396 1089"><a href="#">Dell EMC PowerPath Family – CLI and System Messages Reference – 7.x</a></p> <h2 data-bbox="459 1133 1564 1230">Adding new paths to a Dell EMC PowerPath logical device</h2> <p data-bbox="459 1266 1593 1315">This procedure adds new paths to a logical device <u>already configured</u> (with at least one path) in Dell EMC PowerPath. This procedure can be done without interruption to running applications on Microsoft hosts.</p> <h3 data-bbox="459 1338 520 1360">Steps</h3> <ol data-bbox="459 1373 810 1399" style="list-style-type: none"> <li>1. Confirm the current configuration.</li> </ol>

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	<p><b>powermt display</b></p> <p>2. <u>Confirm the configuration of the logical devices to which new paths are added.</u></p> <p><b>powermt display dev=all</b></p> <p>3. <u>Ensure that the number of logical devices, hardware paths, and I/O paths are as expected.</u> The path state should be alive for known good paths and dead for known bad paths. If there is a problem, correct it before proceeding.</p> <p>4. <u>Make physical path additions as required:</u></p> <ol style="list-style-type: none"> <li><u>Map the logical device to additional storage-system ports.</u></li> <li>Add new HBAs. For details, refer to the vendor documentation.</li> <li>Attach cables.</li> <li>Rezone Fibre Channel switches.</li> </ol> <p>5. If using SAN Manager™, Volume Logix, or Access Logix, make new paths available to the host using those tools.</p> <p>6. Scan for hardware changes in the device manager or alternately, restart. In some cases, the operating system may prompt for a restart after new devices are added.</p> <p>7. Reconfigure Dell EMC PowerPath.</p> <p>8. Inspect the new Dell EMC PowerPath configuration.</p> <ol style="list-style-type: none"> <li><u>Confirm the path state.</u> <b>powermt display dev=all</b> <u>The new paths should be displayed with a state of alive.</u></li> <li>Test all paths. <b>powermt restore</b></li> <li>Scan operating system error logs to ensure that no errors are logged against the new paths.</li> </ol> <p>9. Correct any issues that are detected.</p> <p>10. <u>Save the new configuration.</u> <b>powermt save</b></p> <p><a href="#"><u>PowerPath and PowerPath/VE Family for Windows – Installation and Administration Guide – 7.1 and minor releases</u></a></p>
18 [c] a processor, coupled to the port, the processor configured for detecting a connection	<p>The Accused Products comprise a processor, coupled to the port configured for detecting a connection change between the storage node and a host node, and verifying using the topology database that the port has at least two such paths to the host node.</p> <p>For example, the Accused Products include “two identical Storage Processors (SPs) for redundancy” and the “major components within each SP” of the Accused Products include “1 x Intel CPU” in some models and “2 x Intel CPU[s]” in others. For example, the Accused Products include “multipathing software[] such as PowerPath” that provide “automated path failover and recovery” which, in “the event of a path failover” “automatically direct[s]” all</p>

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<p>change between the storage node and a host node, and verifying using the topology database that the port has at least two such paths to the host node.</p>	<p>“outstanding and subsequent I/O requests . . . to alternative paths” and “should be configured to use . . . optimized paths first and only use non-optimized paths if there are no optimized paths available.” For example, the Accused Products’ “dynamic software’s intelligent and dynamic path testing periodically probes inactive paths to check for path failures.” For example, the Accused Products include “powermt commands” such as “powermt set perform” which “enables . . . performance monitoring for all devices” and “powermt display perf bus” which “displays performance metrics for all paths to all devices and bus ports.” For example, the Accused Products include a “rpwermt set path_latency_monitor” command which “[e]nables . . . path latency monitoring” and a “rpwermt set path_latency_threshold” command which “[s]ets a time interval in seconds within which I/Os should complete” and when “a threshold has been set, PowerPath generates system log messages indicating each threshold crossing that results in a new Max latency (high watermark) for a path.” For example, the Accused Products generate “Multipathing messages” such as “Path &lt;path_name&gt; to &lt;device_id&gt; is dead” when a “path’s state transitioned from alive to dead” and “Path &lt;bus&gt; &lt;tgt&gt; &lt;lun&gt; is dead” when a “path to a device is dead.” For example, the Accused Products’ “Multipathing messages” include a “&lt;storage_system&gt; path &lt;path_name&gt; is dead” message that allows for the “remov[al of] the dead path” if the user responds “y,” in which case the Accused Products will “continue[] checking remaining paths.”</p> <p><i>See, e.g.:</i></p> <p><b>Storage Processor (SP):</b> A storage node that provides the processing resources for performing storage operations as well as servicing I/O between storage and hosts.</p>

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	<p data-bbox="453 240 873 284"><b>Storage Processors</b></p> <p data-bbox="453 297 1724 431"><u>Dell Unity is a dual-node architecture which includes two identical Storage Processors (SPs) for redundancy.</u> It features an active/active controller configuration where both SPs are servicing I/O simultaneously. This increases hardware efficiency since there are no requirements for any idle standby hardware. These SPs along with drives, are enclosed within the Disk Processor Enclosure (DPE).</p> <p data-bbox="453 464 1696 527">The <u>major components</u> within <u>each SP</u> of Dell Unity model 300/F, 400/F, 500/F, 600/F, 350F, 450F, 550F, 650F, and 380/F systems are:</p> <ul data-bbox="504 565 1667 889" style="list-style-type: none"> <li>• 1 x Power Supply</li> <li>• 1 x Battery Backup Unit</li> <li>• <u>1 x Intel CPU</u></li> <li>• 1 x Motherboard with 2 x 10GbE BaseT ports and 2 x Converged Network Adapter (CNA) Ports</li> <li>• 5 x Cooling Modules</li> <li>• 1 x M.2 Solid State Drive</li> <li>• Memory DIMMs</li> <li>• Small Form-Factor Pluggable Modules (SFPs) (Optional)</li> <li>• Up to 2 x I/O Modules (Optional)</li> </ul>  <p data-bbox="470 1182 707 1209">Figure 2 SP Rear</p> <p data-bbox="470 1242 1570 1269">The major components within each SP of Dell Unity model 480/F, 680/F, and 880/F systems are:</p> <ul data-bbox="516 1307 833 1409" style="list-style-type: none"> <li>• 1 x Power Supply</li> <li>• 1 x Battery Backup Unit</li> <li>• <u>2 x Intel CPU</u></li> </ul>

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	<p><u>Multi-pathing software, such as PowerPath, must be installed on the host in order to leverage ALUA. Multi-pathing software should be configured to use the optimized paths first and only use the non-optimized paths if there are no optimized paths available.</u> If possible, use two separate Network Interface Cards (NICs) or Fibre Channel Host Bus Adapters (HBAs) on the host. This avoids a single point of failure on the card and also the slot on the server.</p> <p><a href="#">Dell Unity: High Availability – Technical White Paper</a></p> <p>Physical Specifications</p> <table> <tr> <th></th><th>380F/380</th><th>480F/480</th><th>680F/680</th><th>880F/880</th></tr> <tr> <td>Min/Max Drive Count</td><td>Min. 6 SSDs or 10 HDDs / Max. 500</td><td>Min. 6 SSDs or 10 HDDs / Max. 750</td><td>Min. 6 SSDs or 10 HDDs / Max. 1000</td><td>Min. 6 SSDs or 10 HDDs / Max. 1500</td></tr> <tr> <td>Array Enclosure</td><td colspan="4">A 2U Disk Processor Enclosure (DPE) with twenty-five 2.5" drives</td></tr> <tr> <td>Drive Enclosure (DAE - Disk Array Enclosure)</td><td colspan="4">All-Flash (F) models support 2.5" drives in the 2U twenty-five drive tray. Hybrid models support 2.5" drives in 2U twenty-five drive and 3.5" drives in 3U fifteen drive trays.</td></tr> <tr> <td>Standby Power System</td><td colspan="4">Dell Unity systems are powered by 2 power supplies (PS) per DPE/DAE. Each power supply can provide power to the entire module if the peer PS has been removed or is faulted. DPE power during a power failure is provided by a Battery Back Up (BBU) module. BBU is located within the SP enclosure and provides power to a single module (power zone)</td></tr> <tr> <td>RAID Options</td><td colspan="4">1/0, 5, 6</td></tr> <tr> <td><u>CPU per Array</u></td><td><u>2 x Intel CPUs, 12 cores per Array, 1.7GHz</u></td><td><u>2 x dual-socket Intel CPUs, 32 cores per Array, 1.8GHz</u></td><td><u>2 x dual-socket Intel CPUs, 48 cores per Array, 2.1GHz</u></td><td><u>2 x dual-socket Intel CPUs, 64 cores per Array, 2.1GHz</u></td></tr> </table> <p><a href="#">Dell Unity XT HFA and AFA Storage Specification Sheet</a></p> <p>Based on the powerful family of <u>Intel E5-2600 processors</u>, Dell EMC Unity All Flash storage systems implement an integrated architecture for block, file, and VMware VVols with concurrent support for native NAS, iSCSI, and Fibre Channel protocols. Each system leverages dual storage processors, full 12 Gb SAS back end connectivity and Dell EMC's patented multicore architected operating environment to deliver unparalleled performance &amp; efficiency. Additional storage capacity is added via Disk Array Enclosures (DAEs) and for additional performance, online &amp; offline controller upgrades are available.</p> <p><a href="#">Dell EMC Unity All-Flash Storage Spec Sheet</a></p>					380F/380	480F/480	680F/680	880F/880	Min/Max Drive Count	Min. 6 SSDs or 10 HDDs / Max. 500	Min. 6 SSDs or 10 HDDs / Max. 750	Min. 6 SSDs or 10 HDDs / Max. 1000	Min. 6 SSDs or 10 HDDs / Max. 1500	Array Enclosure	A 2U Disk Processor Enclosure (DPE) with twenty-five 2.5" drives				Drive Enclosure (DAE - Disk Array Enclosure)	All-Flash (F) models support 2.5" drives in the 2U twenty-five drive tray. Hybrid models support 2.5" drives in 2U twenty-five drive and 3.5" drives in 3U fifteen drive trays.				Standby Power System	Dell Unity systems are powered by 2 power supplies (PS) per DPE/DAE. Each power supply can provide power to the entire module if the peer PS has been removed or is faulted. DPE power during a power failure is provided by a Battery Back Up (BBU) module. BBU is located within the SP enclosure and provides power to a single module (power zone)				RAID Options	1/0, 5, 6				<u>CPU per Array</u>	<u>2 x Intel CPUs, 12 cores per Array, 1.7GHz</u>	<u>2 x dual-socket Intel CPUs, 32 cores per Array, 1.8GHz</u>	<u>2 x dual-socket Intel CPUs, 48 cores per Array, 2.1GHz</u>	<u>2 x dual-socket Intel CPUs, 64 cores per Array, 2.1GHz</u>
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	<p>Based on the powerful family of <u>Intel E5-2600 processors</u>, Dell EMC Unity Hybrid storage systems implement an integrated architecture for block, file, and VMware VVols with concurrent support for native NAS, iSCSI, and Fibre Channel protocols. Each system leverages dual storage processors, full 12 Gb SAS back end connectivity and Dell EMC's patented multicore architected operating environment to deliver unparalleled performance &amp; efficiency. Additional storage capacity is added via Disk Array Enclosures (DAEs) and for additional performance, online &amp; offline controller upgrades are available.</p> <p><a href="#">Dell EMC Unity Hybrid Storage Spec Sheet</a></p> <p>Automate Path Failover and Recovery for High Availability</p> <p>PowerPath's automated path failover and recovery eliminates the possibility of disrupting an application due to the failure of an adapter, cable, or user error. <u>In the event of a path failover, all outstanding and subsequent I/O requests are automatically directed to alternative paths.</u> From mission-critical to lower priority applications, your business remains online. <u>This dynamic software's intelligent and dynamic path testing periodically probes inactive paths to check for path failures.</u> When a failed path is found and the fault condition is resolved, the path is automatically restored to service without user intervention and without disrupting applications. Since it is automatic, no complex mapping is required, unlike most other vendors' MPIO solutions.</p> <p><a href="#">PowerPath Multipathing Software – Solution Brief</a></p> <div data-bbox="1020 989 1650 1078"> <div>11</div> </div> <p><b>powermt commands</b></p> <p>This chapter contains the following topics:</p> <p><b>Topics:</b></p> <ul style="list-style-type: none"> <li>· <a href="#">powermt command</a></li> </ul>

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	<p><b>powermt set perfmon</b></p> <p><u>Enables or disables performance monitoring for all devices.</u></p> <p><b>Syntax</b></p> <p>powermt set perfmon={on [interval=&lt;#seconds&gt;]   off}</p> <p><b>Description</b></p> <p>Performance monitoring helps characterize I/O patterns and possibly aide in diagnosing I/O problems.</p> <p>When performance monitoring is enabled, <u>powermt display perf dev=all and powermt display perf bus displays performance metrics for all paths to all devices and bus ports.</u></p> <p>The <code>powermt display options</code> command shows if the functionality is enabled or disabled</p> <p><b>Options</b></p> <p>perfmon=on</p> <p>Enables performance monitoring for all devices. This command initializes the counters, clears all performance measurements including high and low watermarks for latency, and accepts a sampling interval for data collection in seconds with a default interval of 900 seconds (15 minutes). The legacy path latency monitoring threshold measurements are not affected. There is no output.</p>

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	<p data-bbox="457 245 1188 289"><b><u>rpowermt set path_latency_monitor</u></b></p> <p data-bbox="457 302 831 326"><u>Enables or disables path latency monitoring.</u></p> <p data-bbox="457 354 577 389"><b>Syntax</b></p> <p data-bbox="457 402 1499 448">rpowermt set path_latency_monitor=on off [force] host=&lt;hostname&gt; [username=&lt;username&gt; [password=&lt;password&gt; no_password]] [cim_sessionid=&lt;CIM sessionid&gt;]</p> <p data-bbox="457 475 653 511"><b>Description</b></p> <p data-bbox="457 529 1236 553">When you enable or disable path latency monitoring, the setting applies globally to all paths.</p> <p data-bbox="457 566 1608 623"><b>NOTE:</b> Before enabling latency monitoring for the first time, you should not only read this section but also rpowermt set path_latency_threshold for setting a threshold for path latency.</p> <p data-bbox="457 643 1623 716">By sampling outputs from rpowermt display latency you can infer the expected path latencies in your environment, and thus be able to set an appropriate threshold for the generation of meaningful latency events in your system log. To set a path latency threshold, use the rpowermt set path_latency_threshold command.</p> <p data-bbox="457 732 1287 756">The rpowermt display options command shows if the functionality is enabled or disabled</p> <p data-bbox="457 769 1260 794">To avoid extraneous log messages, set a threshold value before turning on latency monitoring.</p> <p data-bbox="457 821 592 857"><b>Options</b></p> <p data-bbox="457 870 684 894">path_latency_monitor=on</p> <p data-bbox="621 902 1549 948">Enables I/O latency measurement on each path, resulting in meaningful outputs from rpowermt display latency, which are the Current (most recent) and Max (high watermark) latencies for each path.</p> <p data-bbox="457 1008 1220 1052"><b><u>rpowermt set path_latency_threshold</u></b></p> <p data-bbox="457 1065 1024 1089"><u>Sets a time interval in seconds within which I/Os should complete.</u></p> <p data-bbox="457 1117 577 1153"><b>Syntax</b></p> <p data-bbox="457 1166 1549 1235">rpowermt set path_latency_threshold=&lt;#seconds&gt; &lt;#milliseconds&gt;ms [force] host=&lt;hostname&gt; [username=&lt;username&gt; [password=&lt;password&gt; no_password]] [cim_sessionid=&lt;CIM sessionid&gt;]</p>

Claims	Exemplary Evidence of Infringement
	<p><b>Description</b></p> <p><u>When a threshold has been set, PowerPath generates system log messages indicating each threshold crossing that results in a new Max latency (high watermark) for a path. This threshold value applies to all paths in your environment.</u></p> <p>For example, if</p> <ul style="list-style-type: none"> <li>the global <code>path_latency_threshold</code> is set to 2, and</li> <li>the current Latency Max for the path (as seen in <code>rpowermt display latency</code>) is 2.5 seconds (2500ms), and</li> <li>an I/O request on the path takes 2.6 seconds to complete,</li> </ul> <p>then the threshold-crossing event is sent to the system log.</p> <p><b>NOTE:</b> For environments where 24x7 latency monitoring is in effect, periodically disable, then re-enable latency monitoring so that high watermarks are zero-ed and threshold crossings are captured in the system log with regularity.</p> <p>When changing the threshold, use the following three steps:</p> <ol style="list-style-type: none"> <li>1. Disable path latency monitoring so that high watermarks are zeroed.</li> <li>2. Set the new threshold.</li> <li>3. Re-enable path latency monitoring.</li> </ol> <p><b>Options</b></p> <p><code>path_latency_threshold=#seconds #milliseconds</code></p> <p>Sets a time interval in seconds within which I/Os should complete. The value applies to all paths. The default value is 0. The range of acceptable values is 0 to 3600 seconds or 0 to 3600000 milliseconds. Seconds is the default.</p> <p>When the threshold is set to zero (also known as Discovery Mode), PowerPath logs every new Max latency for each path. The resulting system log messages can be helpful in determining an appropriate threshold for the system.</p> <div data-bbox="1012 1003 1638 1092"> <p>16</p> </div> <p><b>Multipathing messages</b></p> <p><b><u>Path &lt;path_name&gt; to &lt;device_id&gt; is dead</u></b></p> <p><u>A path's state transitioned from alive to dead.</u></p> <p><b>Action</b></p> <p>Repair the physical path.</p>

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	<p data-bbox="480 245 1484 342"><b><u>&lt;storage_system&gt; path &lt;path_name&gt; is dead. Do you want to remove it (y/n/a/q)?</u></b></p> <p data-bbox="480 358 1474 396">The path failed the last path test. If a path is marked dead or the serial numbers encoded in the path configuration information do not match the serial numbers on the logical device, powermt check prompts you to remove the path.</p> <p data-bbox="480 435 594 467"><b>Action</b></p> <p data-bbox="480 488 630 505">Valid responses are:</p> <ul data-bbox="480 521 1388 613" style="list-style-type: none"> <li>• <u>y</u> — removes the dead path and continues checking remaining paths.</li> <li>• <u>n</u> — does not remove the dead path but continues checking the remaining paths.</li> <li>• <u>a</u> — removes the dead path and any subsequent paths marked dead.</li> <li>• <u>q</u> — does not remove the dead path and exits the command. Any paths that were already removed remain removed.</li> </ul> <p data-bbox="480 641 1360 683"><b><u>Path &lt;bus&gt; &lt;tgt&gt; &lt;lun&gt; to &lt;device&gt; is dead</u></b></p> <p data-bbox="480 699 680 721"><u>A path to a device is dead.</u></p> <p data-bbox="480 756 594 789"><b>Action</b></p> <p data-bbox="480 810 1312 829">Wait for automatic restore. Otherwise, repair the failed paths and then run the <code>powermt restore</code> command.</p> <p data-bbox="438 850 1396 883"><u><a href="#">Dell EMC PowerPath Family – CLI and System Messages Reference – 7.x</a></u></p>